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ABSTRACT

The Satellite Technology Demonstration (STD) of the Federation of Rocky Mountain States (FRMS) employed a technical delivery system to merge effectively hardware and software, products and services. It also needed a nontechnical component to insure product and service acceptance. Accordingly, the STD's Utilization Component was responsible for identifying populations that could use the Project's products and services and for facilitating user involvement through information services and training programs. Both of these functions required extensive interaction with other Project components (Broadcasting and Engineering, Programing, and Research), but the responsibility for coordinating products and services in the field remained with the Utilization Component. In order to coordinate products and services, Utilization had to: (1) develop and maintain a comprehensive field services network; (2) attract and hold audiences; and (3) promote regional telecommunications efforts. The organizational structure for Utilization was based on team interaction, on decentralization, and on a regional, state, and local field services network. (Author/HB)

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SATELLITE TECHNOLOGY DEMONSTRATION

FEDERATION OF ROCKY MOUNTAIN STATES, INC.

technical report

TR0333

THE DEVELOPMENT OF A FIELD SERVICES NETWORK FOR A SATELLITE-BASED EDUCATIONAL TELECOMMUNICATIONS EXPERIMENT

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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INTRODUCTION

The Satellite Technology Demonstration (STD) of the Federation of Rocky Mountain States (FRMS) employed a "technical" delivery system to merge effectively hardware and software, products and services. But it needed a "nontechnical" component to insure product and service acceptance.

Acceptance is a function of field support. It is more than technical expertise or program awareness.

You can have an audience that recognizes a high-quality program, but unless that audience is willing to participate in the program and to accept its problems and inadequacies, you will not have acceptance. And, if you don't have acceptance, you might as well not have a program.

Participation is based on: adequate training of field personnel; user support of products and services; and total involvement of Project personnel. These nontechnical factors are carried out by the "people part" of the STD: its "field services arm," or Utilization Component.

This paper looks closely at the Utilization Component. The paper tells how the component evolved, what it was responsible for, and how it accomplished its assigned tasks.

INVESTIGATING ALTERNATIVES

If a hardware system performs well, then high-quality programs can be effective. But no matter how sophisticated the technology and no matter how exciting the program, the audience must be willing to use the products and services. Without a "willing" audience, the total benefits of the technological delivery system and/or program will not be realized.

Why is a willing audience important? A review of 13 ETV and ITV media-based projects indicated why. Most of these projects appeared to be successful, but were discontinued for lack of support. They were not maximally effective, because:

1. The users understood neither the purpose of the project nor their role in implementing programs.
2. Several projects focused on only part of the total instructional system (for

example, curriculum planning, program development, hardware systems, or teacher training) and not on overall program integration.

3. Educational materials often were not appropriate or relevant for the intended users.

The review indicated that if the STD's Project were to succeed, then the user community had to understand and accept the Project by participating in its design, implementation, and evaluation. In other words, readiness precedes acceptance.

Getting users ready means getting them involved. The Project could insure involvement by: linking users and providers together for initial input and feedback; representing the needs, interests, and unique characteristics of the populations the system hopes to serve; and arranging for cooperation between and among institutions that are affected by the system.

The STD's Utilization Component provided just such an involvement.

DEVELOPING A FIELD SERVICES NETWORK

The STD's Utilization Component was responsible for identifying populations that could use the Project's products and services and for facilitating user involvement through information services and training programs. Both these areas require extensive interaction with other Project components (Broadcasting & Engineering, Programming, and Research), but the responsibility for coordinating products and services in the field remains with the Utilization Component.

In order to coordinate products and services, Utilization had to:

1. Develop and maintain a comprehensive field services network.
2. Attract and hold audiences.
3. Promote regional telecommunications efforts.

The organizational structure for Utilization was, subsequently, based on team interaction and on decentralization; on a regional, state, and local field services network.

Regional Network

The regional network was, by design, small and decentralized. Its primary function was

to coordinate activities between personnel in the field and personnel at the STD's regional headquarters in Denver, Colorado. Essentially, the regional network solicited experts for the field, promoted acceptance for products and services, served as a feedback mechanism to the field, and monitored all field activities.

State Network

Three organizational possibilities originally were considered to develop field services and to insure user involvement:

1. Utilization-related activities would be distributed across all STD components, with each component responsible for identifying and hiring personnel to coordinate specific products and services.
2. Utilization activities would be the responsibility of a centralized component that would have specialists to handle specific tasks and consultants to solve unique problems and situations.
3. A state-level structure would be established that would receive guidance and support from the STD's headquarters in Denver and that would be augmented by a site structure, serving as a localizing unit.

Discussions with various individuals and agencies and input from the eight participating states indicated that a combination of these three approaches would be the most effective organizational structure. The early development of field services was oriented toward the concept of user involvement. The STD's plan to provide local school services which were meaningful and acceptable in the local setting required local involvement in planning, operating, and evaluating the Project. In turn, this level of user involvement would require the early development of the Project's credibility and access to state and local personnel.

The STD decided that these goals could be accomplished best by hiring a full-time state coordinator. This coordinator would be a state advocate, funneling state and local input into the STD's regional office and influencing the STD's state-oriented programming. Also, the coordinator would be the STD's representative in the field and would promote acceptance of STD products and services by developing user participation in planning; by explaining the intent of, and suggesting alternatives for, STD services; and by getting state and local agencies to

commit resources to STD products. This double role for the state coordinator--as a state and local advocate, on the one hand, and as a Project advocate, on the other--was the key to implementing field services. Dual advocacy incorporated all three organizational possibilities for creating a field services network.

Once the decision was reached to employ a state-based coordinator, the question of placement became crucial. The development of Project credibility and access to state resources guided the decision to place state coordinators within ongoing state institutions, preferably state departments of education.

This arrangement allowed the Project to operate through traditional channels in the eight states and gave the STD an "inside image" rather than a short-term, "foreign" appearance. The state coordinators, by virtue of state department status, had access to existing educational resources in the states, allowing them to keep personnel informed of Project goals and progress (Project advocacy) while keeping themselves informed about state needs that would affect Project decision-making (state and local site advocacy).

The total effect of this arrangement was to integrate the Project into exisitng workable state agencies rather than to enter it into competition with the states. Integration rendered STD activities more acceptable to states and sites and was a major factor in the acceptance or rejection of the Project's "innovative" programming.

Organizational Processes

In spring, 1972, the Utilization Component staff visited state agencies to discuss the status of the Project and the placement of the state coordinators. Previous general orientation meetings had been conducted at the regional office in Denver and in the states between the STD's regional staff and state governors, school superintendents, and officials. The spring, 1972, meeting was the first, however, to address specific operational procedures. In all the states, except Idaho and Nevada, state coordinators were placed in the state departments of education. In Idaho, the position was located in the Human Resource Council, which is attached to the governor's office; in Nevada, the state coordinator was housed in the Nevada Educational Communications Commission. Officials in Idaho and Nevada felt that the STD's goals could be served best in these offices.

Three alternatives for funding the state coordinator's position were discussed:

1. Direct Funding. The coordinator could be a FRMS's employee, paid directly by the STD's federal sponsor.
2. Indirect Funding. The coordinator could be a state employee, paid indirectly by the STD's federal sponsor through a designated state agency.
3. Combination Funding. The host agency (the federal sponsor) and the STD could subcontract jointly for the state coordinator's services.

A mix of the first two alternatives finally was adopted.

Between late October, 1972, and early January, 1973, grants were issued to the states of Arizona, Colorado, Idaho, Montana, Nevada, and Utah. Each $20,000 grant covered the state coordinator's salary and benefits. Salaries, which varied, were established by individual state criteria to insure consistency within the respective states. The states agreed to provide office space, telephones, clerical support, and associated services. If costs exceeded $20,000, then the states paid the difference. In-kind contributions by states were documented throughout the Project. In New Mexico and Wyoming, state coordinators were paid directly by the STD. These two states agreed to provide support services in the departments of education. This variation was necessary, because Wyoming's Department of Education was limited by legislation to existing full-time equivalent staff and because New Mexico's state salary structure was too low to attract a "qualified" coordinator.

Job descriptions and qualifications were discussed with the host agencies' personnel, who played a major role in hiring the state coordinators. The agencies identified three persons who were believed to be qualified for the position. Regional personnel interviewed the three applicants and, with the agreement of the host agency, selected one to be the state coordinator. Eight state coordinators were hired between October, 1972, and December, 1972.

The advantages of the arrangements made to select and place state coordinators were clear. In all cases, the position was incorporated by the state in a workable and ongoing agency, demonstrating the agency's sanction and support of the STD. This support was manifested in the positive attitude of state officials and in the officials' willingness to support the Project above and beyond the level provided by the basic $20,000 grant.

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The one disadvantage of these arrangements was that line-staff relationships between the state coordinator and the STD vis-a-vis the host agency might become ambiguous. It was agreed that the coordinator would have a host-agency supervisor and would be allowed to work on state tasks commensurate with time and STD responsibilities. It also was agreed that STD supervision would be provided in addressing Project tasks.

To minimize the obvious potential for conflict, the Utilization Component (representing the FRMS) developed and negotiated contracts with each state. The contracts specified the state agency's responsibilities and stated clearly Project roles and expectations. In other words, these contracts were formal commitments. In certain cases, the contracts were invaluable in settling minor differences. In addition, several potential disputes were avoided by the existence of the STD-state agency contracts. Thus, the contracts were worth the effort spent negotiating and contracting; they were an important facet of the field services network.

By spring, 1973, a major characteristic of the field network--its flexibility--emerged and continued to be exhibited throughout the developmental and operational years. As previously stated, placement and funding details for state coordinators varied from state to state. The contracts also varied according to the legislative mandates under which each contracting state agency operated.

In establishing and maintaining state and site relationships, the Project's Utilization Component demonstrated an ability to be flexible and to accomplish different tasks under varying circumstances. Flexibility cannot be maintained without staff time and Project funds to detail eight separate "task" strategies. For the STD, however, the ability to respond (through field services) to different situations in a flexible manner was a necessary element in localizing services, integrating services into ongoing institutions, establishing service credibility, and facilitating user acceptance.

Site Selection

State coordinators immediately became involved in the planning and development of the STD. They began to provide state input on plans for STD programming, site-entry and selection procedures, and communications procedures. At the same time, they began to familiarize host-agency personnel with the STD and, in turn, to offer suggestions that reflected

state needs and concerns.

Discussions about site selections were held with representatives of each state on a continuing basis from early in 1972. Representatives included: the governors of each state; the chief state school officers; and the content and technical specialists in each state.

Selection variables for sites included the following:

1. Geographic characteristics--
   (a) metropolitan
   (b) urban
   (c) rural
   (d) rural-isolated
2. Ethnicity--
   (a) Anglo
   (b) Chicano
   (c) Indian
   (d) Black
3. Site and community interest in, and commitment to, the STD as determined by--
   (a) Meetings
   (b) Site visits
4. Strength of local leadership
5. Physical location in the ATS-6 coverage area

Extensive demographic information on the eight-state region was collected and reviewed. This information helped to generate a tentative list of more than 500 Project sites. The list then was forwarded to selected representatives from each state--department of education personnel, public broadcasting station managers, and STD content personnel--for additional input.

In fall and early winter, 1972, the list was revised to reflect the availability of equipment and funding for site-support activities. State-coordinator input and recommendations were included during this revision. Since the state coordinators had firsthand knowledge of their respective states, they coordinated the site-selection process. And, since they knew many

individuals, organizations, and agencies in the state, they were familiar with potential sites. Subsequent revisions in December, 1972, resulted in another list of 250 sites. This list was submitted to the Interagency Radio Advisory Committee and to the Federal Communications Commission in order to clear the sites for two-way communications.

Starting in December, 1972, letters of inquiry were sent to selected representatives in the 250 nominated communities. The letters introduced the Project, explained Project goals, and invited community representatives to attend one of several informational meetings that were scheduled for each state. The meetings were attended primarily by school superintendents and principals, but serveral meetings also were attended by school board members, curriculum directors, public television station personnel, staffs from Boards of Cooperative Services, and other community representatives.

The meetings, which were conducted by state coordinators and members of the Utilization staff, outlined the technological capabilities of the ATS-6 and the objectives of the STD. The STD's public information tape/slide show was shown. After a question and answer period, the audience was asked to indicate community interest in participating in the Demonstration. All but one of the communities indicated a definite interest in the Project.

The state coordinators then visited the interested communities. During each visit, the coordinator:

1. Met with the school superintendent and members of his staff.
2. Collected information about the school, including demographics, school busing distances, classroom and other facility information, school schedules, and school experience in, and plans for, career education.
3. Visited with key community leaders, described the Project, and collected additional information about the community, including community and county demographics, community commitment to education, driving time to metropolitan centers under good and poor road conditions, and media services in the community.
4. Held a specially-convened evening meeting to present the STD to the public, to show the STD's tape/slide presentation, to answer questions about the

Project, and to determine audience interest in participating in the STD.

Site visits, collected data, and input from the state coordinators all were used to categorize the nominated sites into three priority lists:

1. Comprehensive Sites, which would have two-way audio, video, and digital capabilities.
2. Intensive Terminal (IT) Sites, which would have two-way audio and digital capabilities.
3. Receive-Only Terminal (ROT) Sites, which would have one-way reception of audio and video signals.

Early in 1973, the Office of Education determined that the costs for originating video programs at the sites were prohibitive and also that the Interagency Radio Advisory Committee would not clear 2.25 GHz frequencies, except in Alaska. Comprehensive Sites were, therefore, eliminated. Sites originally identified as Comprehensive were moved to the top of the Intensive list, moving the lower ranking Intensive Sites to the top of the Receive-Only Site list.

A study was conducted to compare the costs of: (1) redesigning the ATS-6; and (2) using land-line communication for Intensive Sites as a possible alternative. The study revealed that not only would it be too costly to make the necessary frequency change to the ATS-6, but also it would be too costly to install land-lines for remote sites. While the study was underway, the STD's engineering staff determined that the ATS-3, an earlier satellite, could be used at minimum cost. Use of the ATS-3, however, was favorable only in rural and rural-isolated communities, because its frequency interfered with certain commercial band widths in urban areas. The STD finally decided to use the ATS-3 as the audio communications link between rural and rural-isolated Intensive Sites and Denver and to use land-lines between urban and metropolitan Intensive Sites and Denver.

Sites utilizing the ATS-3 required Federal Communications Commission (FCC) clearance, and the FCC required 60 days to rule on each site. This time constraint meant that the STD had to accelerate its site visits and site selections.

On Friday, March 30, 1973, the National Aeronautics and Space Administration asked the STD to select (by April 5, 1973) 24 rural sites which would use the ATS-3. These sites were

cleared by the FCC and included in a list of 68 sites prepared by the STD in May, 1973. In addition to the 24 FCC-approved Intensive Terminal Sites, the list included 16 Intensive Terminal Sites using land-lines, 16 Receive-Only Terminal Sites, and 12 Public Television Stations.

Although the STD had hoped that this list would be the final list, budget reductions and federal decisions led to further revisions. As stated above, original research plans called for a sampling of sites from rural to metropolitan. A federal decision, however, specified that only rural and rural-isolated sites be included. In addition, a new requirement--"non-redundancy"--was added to the site selection criteria; no site with adequate public television (PTV) reception could be designated for programming via satellite.

Because of these specifications, as well as a reduced budget, sites designated as "Land-Line Intensive" had to be dropped from the Project, since they were located in areas with PTV coverage. These sites were replaced with rural, nonredundant sites that had receive-only capability. The final site list included 24 Intensive Terminal Sites, 32 Receive-Only Terminal Sites, and 12 Public Television Stations.

Nominated communities which were not included in the final site slection were put on a backup list. The list would be used if: (1) a selected site did not meet all research requirements; (2) site negotiations broke down; (3) a site withdrew from the Project; or (4) additional sites were assigned to each state.

Site negotiations were formulated by regional and state staff. The final site contract for each state was modular; that is, various aspects, such as level of support, were written in modules so that contracts could be tailored to individual assignments. The final contracts were distributed to each state on September 15, 1973, and all site contracts were signed and returned to the STD by November 15, 1973.

Site contracts originally specified varied levels of Project support, ranging from hiring part-time to full-time site personnel. With approval of the fiscal year 1975 budget at a reduced level, it was possible to determine levels of support for participating sites, based on available dollars. The final contracts varied only according to Intensive and Receive-Only Terminal Sites. Intensive Terminal Sites received more funds, because these

sites had additional engineering, equipment, and research requirements.

Local Network

During late winter and early spring, 1974, state coordinators worked closely with STD schools to select site coordinators. The timing was critical: STD programming was scheduled to begin in fall, 1974, and it was essential that trained site coordinators be in place by the end of the current school year.

Several alternatives were considered for placing site coordinators. The site coordinator's role was thought to be the key localizing agent in the Project. Just as the state coordinator gave the STD credibility at the state level, the site coordinator would give the STD strong local sanction. All site coordinators were, therefore, selected from the local community.

But one question remained: Should the site coordinator be a school-based person or a community-at-large representative? Available funds impacted heavily on the decision. Intensive Terminal Sites were allowed $1,500 each for support of a coordinator; Receive-Only Terminal Sites were given $900. The funds covered salary, travel, telephone, postage, and similar expenses. The regional field services staff and the state coordinators felt that these funds were not adequate to attract quality site coordinators from the community-at-large.

Recognizing the need for flexibility, the STD then asked the state coordinators to: (1) assign a teacher to the STD class and hire a coordinator from outside the school; (2) assign a teacher to the STD class and hire another teacher or other school staff member as site coordinator; or (3) assign a single teacher to function as both teacher and site coordinator. In most cases, the third option was selected. In others, two persons were involved--one teacher to instruct the class and a second school staff member to be site coordinator. Only in a few cases were persons from outside the school employed as site coordinators.

The operational year showed that all three alternatives worked, depending on how committed the site coordinators were and how supportive the schools were to the Project.

However, the likelihood of successful acceptance of products and services increased with a site coordinator who was not tied to a rigid schedule. Because teachers are tied to rigid class schedules, they often do not have the flexibility to function effectively as site coordinators. Community representatives and school counselors (with their more flexible schedules) have more time to devote to site activities.

In all cases, employment agreements were negotiated between the STD and the site coordinators. The agreements specified dual supervision of the site coordinator by the state coordinator and by the school principal. In seven states, grants were made to the school which then reimbursed the site coordinators. In Arizona, state statutes prohibited local schools from receiving direct grants; therefore, site coordinators were paid directly by the FRMS.

Training

An important advantage of a permanent field network with specific individuals assigned to each location is that information is readily available. Training is not a separate function of field services; it is, instead, an integral part of the overall Project structure.

Training occurred daily as new information about products and services appeared. Project staff communicated with all state personnel before state coordinators were hired. As the state coordinators were employed, STD-state communications intensified and formalized. State-coordinator training sessions were conducted to discuss all STD tasks and communicate those tasks to state and local personnel. State coordinators communicated with school superintendents; as the site selection activities required information about specific school buildings, they also communicated with school principals. STD-site communications began with the employment of site coordinators. The state and site coordinators and STD personnel shared information about: "What I do"; "What you do"; and "How we solve this or that problem." This information flow was immediate and continuous.

There were four formal training sessions. The first began shortly after state coordinators were hired at a meeting in Denver. Plans were outlined for the succeeding months and the coordinator's role was specified. This format of a state coordinator's meeting to plan the step-by-step procedures for subsequent activities (training, site selections, and public

information) was used throughout the Project. After site coordinators were identified in the spring, 1974, state coordinators visited each site and conducted comprehensive orientations with the site coordinator, classroom teacher (if a separate person), school principal, and school superintendent. This orientation (the second training session) was a detailed, full-day meeting covering all aspects of the STD. On the same visit, the state coordinator also made a less-detailed presentation to the entire school faculty. The goal of these meetings was to prepare the site personnel for training on data collection and equipment operation, as well as for moving directly into the Project on their return to school in the fall.

In August, 1974, a regionwide, preservice meeting (the third training session) was conducted; all STD components were involved in the meeting. Site coordinators, several teachers, and other school staff in each state met with the state coordinator for three days at one Intensive Terminal Site. During this time, they viewed and discussed five hours of broadcasts from Denver by the staff of the STD components. Most of the remaining time was devoted to equipment operation and data collection training.

Between the end of the first semester and the beginning of the second semester, site coordinators again met at a central location in each state; this was the fourth training session. Considerable time was spent not only in discussing data collection and reporting problems, but also in generating suggested changes for the second semester. The greatest benefit of this session was in the exchange of ideas and operational procedures among the site coordinators.

The four events, described above, represented formal training sessions. It must be emphasized, however, that training was a continuous activity that was made possible by the daily functioning of the field network. Problems were identified and solved. Procedures were changed and refined. These activities were possible, because the field services network provided immediate accessibility of personnel and information at all Project levels.

Communications

One of the major constraints of the field service structure was the physical and functional distances among its regional, state, and local segments. Another constraint was the

nature of the STD: Developmental by definition, the Project had many false starts and reversals. It was difficult to communicate changes about specific program areas or about technical equipment to part-time site coordinators. It was necessary, then, to develop a system of communications which provided a consistent and accurate source of information about the Project.

Therefore, the STD adopted standardized field communications policies and procedures, which made the Utilization Component the source of all communication to and from the field. This organization insured that all field staff received consistent information at the same time. Similarly, the communications procedures provided field personnel with guidelines for clarifying issues or solving problems at the sites.

The communications policy linked and guided the various units of the field structure. Through the mechanism of the field network, users were advised of, and asked to react to, the Project's tentative plans. User input was funneled to decision-makers, plans were finalized, and appropriate procedures were adopted. Through the field services network, site personnel were trained and prepared to utilize STD products and services. Once services were delivered and utilized, users responded to the services with suggestions for improving the programming. These suggestions again were referred to decision-makers. Thus, the field services network linked the designer and the user and allowed the community to get involved in the planning, development, operation, and evaluation of the technological delivery system.

CONCLUSIONS

This report has stressed the fact that a willing and prepared audience is essential for successful utilization of technology and software. The paper also has stressed the importance of getting users involved; obtaining local sanction; creating and maintaining audience acceptance; and incorporating appropriate elements into ongoing programs. Finally, the paper has shown how these parameters guided the development of the Project's field services support network. A few major characterisitics of that structure merit restating:

1. User Base. In all planning and development activities, user input was actively

solicited, considered, and incorporated into programming. A responsive feedback mechanism and a monitoring system also were integrated into the user-based process.

2. Dual Advocacy. At all three levels--regional, state, and local--personnel individually provided user-based input into the decision-making process.
3. Flexibility. The general network structure was modified and adapted, as necessary, to different conditions in each state and each site.
4. Integration. The field service structure was integrated, whenever possible, into ongoing systems.
5. In-Kind Support. Participation in the STD required in-kind contributions from states and from local sites.
6. Contracts. All relationships between the STD and state and local agencies were secured by formal contract.

Utilization, in short, is people helping people to accept, understand, and use technology.

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